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THE PLANT DISEASE REPORTER

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OFFICE OF MYCOLOGY AND DISEASE SURVEY

Vol. XIV July 1, 1930 Number 13

DISEASES OF VEGETABLE CROPS

SWEET POTATOES ATTACKED BY TYLENCHUS DIPSACI, THE BULB OR STEM NEMA

By G. Steiner, Senior Nematologist,
Bureau of Plant Industry.

Through the courtesy of Dr. Martin, Plant Pathologist of the New Jersey Experiment Station, and Dr. Harter of this Department, sweet potatoes badly affected by Tylenchus dipsaci were received. It is the first time that sweet potatoes have been observed to be parasitized by this nema, which, however, is known to attack over 130 different plants including many important crops.

In the affected sweet potato roots a black or dark brown ring appears just under the cuticle and first spreads over the subdermal region. Externally hardly any symptoms can be seen; here and there sunken portions may be observed but strictly speaking there is no discoloration. However, when the tuber is cut, the black ring under the surface always appears (see plate 5, fig. A). In later and more advanced stages of the disease black streaks and dark portions can be seen also through the more central parts of the root (plate 5, fig. B), which finally decays completely. A microscopic examination reveals that the black tissue harbors thousands of nemas. At present the disease is known from southern New Jersey and from the Eastern Shore of Maryland (through the courtesy of R. T. Grant, County Agent, Snow Hill, Worcester County), but is very probably much more widespread throughout regions where sweet potatoes are grown.

Only diseased roots have been seen and symptoms in connection with the growing plant, together with other details, are the object of further studies.

Material suspected to be affected with this disease, or any information concerning it, will gladly be received.

It may be noted that Tylenchus dipsaci is known to be a bad pest of the Irish potato in northern Europe but up to the present has not been observed on this host in the United States.

SOME REPORTS ON DISEASES OF TOMATOES

Alabama: From specimens and reports received, wilt (Bacterium solanacearum) is causing considerable trouble in all sections of Alabama.

Leaf spot (Septoria lycopersici), contrary to the general rule, is showing up very early this season. It cannot be said to have done much damage to date, but is found in practically all tomato plantings. (J. L. Seal, June 15)

Texas: Blight (Septoria lycopersici) causing heavy burning effect on foliage in all tomato sections visited in the lower Rio Grande Valley (Cameron and Hidalgo Counties), Webb, Dewitt, and Brazos Counties. The general loss from this disease in all the territories reported above was estimated at a total of about 5 per cent of the crop grown in the counties.

Wilt (Fusarium lycopersici) very common and prevalent in Dewitt and Lavaca Counties, and found in fields supposed to be planted to Marglobes. It seems evident that either the Marglobe seed were not genuine selected seed or that the Marglobe variety is not very resistant to wilt under our Texas conditions. Losses in the two counties 10 per cent.

Bacterial fruit spot (Bacterium vesicatorium), packers and growers frequently mistake this disease for nailhead rust. Only a trace found in lower Rio Grande Valley, Dewitt, Lavaca, and Brazos Counties.

Mosaic (unknown), suddenly appearing in epidemic form in the lower Rio Grande Valley, Dewitt, and Brazos Counties. Probably appeared too late to cause any damage.

Puffing (cause unknown), 60 per cent loss in lower Rio Grande Valley; 20 per cent loss in Dewitt and Lavaca Counties; 40 per cent loss in Brazos County.

Center or core rot (bacteria and perhaps fungi) is very prevalent in lower Rio Grande Valley, Dewitt, Lavaca, and Brazos Counties, causing an average loss in all counties of about 20 per cent of crop.

In Brazos County, tomatoes are grown this year for the first time on a commercial basis. The variety grown is Marglobe. It is interesting in this connection to note that no wilt was found in all the fields examined where the tomatoes were planted on new land. On the other hand, heavy losses occurred from puffing as well as from core rot. The core rot or center rot was sporadic and in one particular field the loss was estimated around 96 per cent, whereas in other fields it varied from 1 to less than 3 per cent. In addition, considerable early blight (Alternaria solani) and late blight (Septoria lycopersici) were quite common in spite of the fact that tomatoes were first grown on a commercial basis and in all cases on practically new land. (J. J. Taubenhaus, June 15)

DISEASES OF SPECIAL CROPS

DISEASE SURVEY OF TOBACCO SEED BEDS IN PENNSYLVANIA

By W. S. Beach

During the first week in June, a survey was made of the tobacco seed beds in Pennsylvania with the purpose of obtaining enough data to furnish a key to general conditions in regard to diseases and especially in regard to wildfire which for several seasons has been a problem with the farmers.

The recent census shows that there are considerably more than 6,000 farms growing tobacco in Pennsylvania. The most of these are within Lancaster County with some in the adjoining counties of York, Chester, and Lebanon. Two small areas of tobacco culture occur in Clinton and Tioga Counties. Pennsylvania tobacco is used in the manufacture of cigars mostly for fillers and binders. In the Lancaster section, common varieties are Swarr, Hibshman, Swarr-Hibshman, Slaughter or native strains more or less similar. Field areas range from about 3 to 15 acres.

Most farmers undertake to grow their own seedlings. A few have their plants grown upon contract by individuals growing more extensive seed beds. The preparation of seed beds is begun in March. A heavy application of cow manure is spaded or plowed under after which the soil is steamed. The manure combined with the beneficial effects of steaming usually provides all the necessary fertility to grow large vigorous plants. In only a few cases was any mixed or complete commercial fertilizer found to be applied to seed beds. Forcing backward seedlings with nitrate of soda is not uncommon, and with the same purpose some try to wash in goat, sheep, or chicken manure by applying the hose after the fertilizer is broadcast. This is poor practice and commonly causes leaf injury.

Steaming of seed beds is almost a universal practice in Pennsylvania, and there is little to criticise in the performance of the process except that the period of steaming might be lengthened in some cases of heavy damp soil and that the process cannot be expected to free board frames from wildfire contamination. Upon recommendation, the period of steaming is being increased to 25 or 30 minutes.

In 1928, a campaign was undertaken to have seed cleaned by a blowing machine and sterilized with silver nitrate. On account of the lack of evidence that native seed would be contaminated with wildfire, if cleanly handled in threshing, sterilization has been limited recently to seed of uncertain source. In the present survey there is little to indicate that seed is a source of inoculum.

In order to aid sprouting and the early establishment of the tiny seedlings, several types of mulches are applied to seed beds beneath the cloth or glass covers. A common one is scattering a layer of hog bristles over the soil. Many apply straw in a similar way. Others use burlap or old muslin. These mulching materials are removed when the seedlings have become rooted. There is some risk in these mulches carrying wildfire inoculum unless from a clean source or properly sterilized. It provides one more material for a careless person to overlook in sanitation. Since the hog bristles are used for several years, they may readily become contaminated.

In the disease survey, 55 farms in the north, central, and eastern parts of Lancaster County and in Chester County were inspected. The total seed-bed area on these comprised approximately 75,000 square feet. This is probably nearly 1 per cent of the total seed bed area of this tobacco section. Upon 14 of the 55 farms some wildfire (Bacterium tabacum) was found. The total area exhibiting infection of some of the seedlings comprised 6,465 square feet. Mr. F. S. Bucher, Agricultural Agent for Lancaster County, is of the opinion that the degree of wildfire occurrence in the part of the county south and west of the city of Lancaster is essentially the same. It appears therefore that about 25 per cent of the farms have wildfire and nearly 9 per cent of the seed-bed area has diseased seedlings. The data of the survey along with reports of disease indicate that wildfire is distributed to all parts of the tobacco section of which Lancaster, Pa., is the center.

Most of the infection this year appears to have arisen late or after the middle of May. In five cases, infection was not discernible until a second inspection, earlier inspections having been made May 13 or May 23. The early reports of wildfire occurrence came to the Farm Bureau from May 20 to 23.

In only three cases of the 14 personally inspected was the distribution of the disease on the beds so general as to make complete abandonment of the beds advisable. In five instances, the areas affected were so limited that they could be readily and effectively destroyed. In the other six cases, the safety of using the unaffected areas would depend much on the care of the workers.

With respect to the results of control measures, the most impressive was the general success in those cases in which a new and as far as known disease-free site was chosen for the seed beds, and in contrast the indifferent success or failure where sanitary measures were tried upon old seed-bed locations. Apparently aisles and the immediate vicinity of old beds provides the inoculum. The majority of the beds have occupied the same position for many years, and although the steaming process may be satisfactory in itself, the expense and difficulty of destroying refuse in the aisles and weedy places close at hand renders sanitation impracticable. It appears therefore that nothing else will go so far in eliminating wildfire in the Lancaster section as rotation of seed beds.

The proximity of the tobacco barns in which wildfire infected crops have once been stored presents a danger. Among the 55 farms, there were 21 cases in which the barns were within 100 feet of the seed beds, 22 cases in which they were between 100 and 200 feet and the rest from 200 to 350 feet or more. It appears that 300 to 400 feet may give a much greater measure of safety and this would be still within the limits of conveniences that could be provided in watering and other care. In at least 8 instances of wildfire found in the survey, the barn appeared to be probable source of inoculum.

Spraying seed beds in Pennsylvania has not been strongly recommended in the past in view of the difference of opinion regarding its effectiveness. However, experimental tests have shown such effectiveness this season that there appears to be sufficient justification for this control measure both in respect to flea beetles and wildfire. Only about 25 per cent of the farmers were found to have sprayed at all, and in only three cases in the survey were the applications frequent enough to insure control. In most cases there was too much delay in starting. The late appearance of wildfire this year probably gave the tardy spraying a better chance. It is noteworthy that there was only one case of wildfire among those who sprayed, and the source of inoculum here was apparently contaminated hog bristles used for the mulch at germination time. Undertaking to spray no doubt is joined with care in sanitation usually, while on the other hand most cases of wildfire are coupled with no efforts at control.

Other than the occurrence of wildfire, there were no diseases of consequence in the seed beds of the Lancaster section. There was one slight occurrence of angular leaf spot (Bacterium angulatum), a few centers of damping-off caused by Rhizoctonia, and a few cases of mosaic. Flea-beetle damage was rather general, being greater than in 1929 but less than in 1928. Snails do considerable damage early in the season and often reduce the stand greatly.

In general the vigor of the seedlings grown in Pennsylvania is excellent. The chief problem appears to be one of instructing a considerable group of farmers in the technique of sanitation. Those in touch with the disease situation are of the opinion that conditions in the seed beds are a considerable improvement over those of 1929.

TOBACCO SEED BEDS IN KENTUCKY

By W. D. Valleau

Inspections were made May 12 to 22 in Fayette, Warren, Logan, Todd, Larue, Hart, Christian and Mercer Counties. The season has been unfavorable to the development of good beds of plants and to disease in the beds. Beds which were sown early germinated well and resulted in good stands. Beds sown later in many cases were affected adversely by drouth, the seed not germinating uniformly and leaving very spotted stands. The continued warm, bright, dry season resulted in vigorous and very early plants in most beds in spite of the drouth so that plants were generally in excellent condition although often few in number. The setting season has been very dry and there has been difficulty in obtaining stands of plants especially where no machines were available.

Angular leaf spot (Bacterium angulatum) was less prevalent than usual and limited to small areas in the bed. Mosaic plants were rarely found in plant beds as inspections were made at or before setting plants. A bacterial rot was found in two beds causing rotting off of smaller plants but usually rotting one side of larger plants. The organism is one of the soft rot organisms, and is very similar to, if not identical with Bacillus aroideae in its reactions on various media and in morphology. These comparisons were made by Dr. E. M. Johnson under the direction of Dr. Leach at the University of Minnesota, who considered it to be B. aroidea. Plants 8 to 10 inches tall with lesions nearly girdling the stem have survived when set in the field. The tissues soon seem to become resistant to the further penetration of the organism. Growers are evidently familiar with this disease and fear it during periods of wet weather and in crowded beds. Black root rot (Thielavia basicola) was found in only one seven-year old bed which had been steamed.

Both ringspot and coarse etch were found in plant beds and have each been found several times since the summary was prepared. During the past winter evidence has been obtained showing that ringspot is carried in a small percentage of seed from Turkish tobacco plants affected with ringspot and evidence is accumulating which indicates that coarse etch may also be seed borne.

COTTON WILT CAUSING DAMAGE IN ALABAMA

Several reports of cotton wilt (Fusarium vasinfectum) have come from the coastal plains section. This disease seems to have appeared very early and is doing a great deal of damage in certain localities. (J. L. Seal, June 15)

DISEASES OF CEREAL AND FORAGE CROPS

SOME REPORTS ON WHEAT DISEASES

Glume blotch (Septoria nodorum) in Kentucky: Quite prevalent as a cause of spotting on glumes of wheat. Found in Laurel and Fayette Counties but probably generally distributed. Its abundance in some fields in spite of a very dry season seems odd. (W. D. Valleau, June 15)

Scab (Gibberella saubinetii) in Missouri: Up to the present time, scab infection has been lighter in this state than it has been for several years. The heaviest infection is in the west central and northwestern part of the state where the spring rainfall has been the greatest. The small percentage of infection in other sections of the state may well be attributed to the droughty conditions prevailing throughout April and May and early June. (I. T. Scott, June 12)

Loose smut (Ustilago tritici) in Missouri: Less severe than usual in Missouri this season. A few fields have been observed in northwest Missouri showing as high as 5 to 6 per cent infection. This section has received more rainfall during April and May than any other section of the state. In the extensive wheat growing sections of eastern Missouri the percentage of infection will not go over 1 per cent in most fields, and many show only a trace. In the southeast Missouri lowlands a number of fields show 2.5 per cent; the average for the region will run about 1.5 per cent. Southwestern and central Missouri show less than 1 per cent infection on the whole. (I. T. Scott, June 12)

BACTERIAL WILT OF SWEET CORN PREVALENT IN MISSOURI

Bacterial wilt of sweet corn caused by Aplanobacter stewartii appears to be widespread over Missouri this season. Reports and specimens have been coming in from all sections of the state for the past ten days. This disease has only occurred sporadically over the state previous to this season. Some fields show as high as 75 per cent infection with most of the plants dead or dying. At the present time no valid reason can be given for the widespread occurrence of this disease in Missouri. If the outbreak had occurred in a single community it might be traced to a single seed source, but there is no reason to think that the seed used in planting the widely separated fields came from the same source. The season has been unusually dry in Missouri, the rainfall for April and May being considerably below normal. So far as can be learned most of the varieties attacked are early maturing, Golden Bantam being the most commonly grown.
(I. T. Scott, June 12)

BACTERIAL WILT OF ALFALFA (APLANOBACTER INSIDIOSUM) IN OHIO

The wilt is beginning to cause concern in the western portion of the state. The Hardigan shows marked resistance with Canadian Variegated second. Other varieties in some instances are suffering 25 to 30 per cent loss. (R. C. Thomas, July 1)

WILT DISEASES OF SWEET CLOVER

Kentucky: A wilt disease of sweet clover was observed, in Oldham County, in an orchard sowed a year ago. The infection was spotted over the field, but in certain small areas as many as 20 dead or dying plants could be found in an area of 2 square yards. When found (April 15, 1930), the ground was dry and had been so for some time. The disease rotted the crowns, which then shriveled on the diseased side. The tissue remained tough in contrast to the soft rot produced by Sclerotinia trifoliorum. Sections showed the presence of a large diameter, apparently non-septate mycelium in several of the rotted roots. On partially killed plants, destruction of the larger roots proceeded rapidly, evidently as a result of Fusaria. While sweet clover diseases have not been given close attention in Kentucky, it appears that some disease has been an important factor in practically eliminating sweet clover from the weed flora in the limestone section in northern Kentucky - Grant, Pendleton, etc., Counties. Where formerly it grew wild, it is now difficult to find. (W. D. Valleau)

Ohio: Both yellow and white varieties are seriously affected by a wilt disease caused by a yellow bacterium, (species undetermined). The organism appeared to be seed borne. Losses in western Ohio have been serious for the past two years. As yet no evidence of the disease has been noted in the eastern portion of the state. The organism which causes wilt of sweet clover is different from the one causing a similar disease in alfalfa. (R. C. Thomas, July 1)

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FRUIT DISEASES

APPLE SCAB (VENTURIA INAEQUALIS)

Connecticut: Although the ascospore stage on the old leaves was found mature here earlier than usual (March 20 by Dr. McCormick), this was too early for infection and apparently infection really took place later than usual and to a less degree. This year's infection on the new leaves was first found on June 2 and to date little infection has shown even on unsprayed trees. (Clinton and Stoddard, July 1)

Pennsylvania: Since May 31, 1930, preliminary check-up on apple scab, mostly leaf infections, has been made in the counties of Bedford, Bradford, Columbia, Cumberland, Dauphin, Franklin, Huntingdon, Juniata, Luzerne, Mifflin, Northumberland, Susquehanna, Union, and Wayne.

In general, very satisfactory control of apple scab has been secured except where liquid lime sulphur has been poorly applied and occasionally where commercial liquid sprays have been used. It is interesting to note that wherever any amount of scab infections has been found that some other fungicide than liquid lime sulphur has been used.

The infections on check trees in the counties south of the Juniata River show that there was a very early discharge of scab spores. In the counties from Northumberland to the New York State line, the heaviest spore discharge occurred about May 13 to 16. There was also a discharge of spores at this time in the south counties.

A summary of results of leaf infection to date is as follows:

Type of spraying	Average percentage of infection	
	On leaves	On fruit
Good spraying	0.33	—
Poor spraying	10.20	—
Combinations of Liquid & Dusts	33.70	26.0
Unsprayed orchards	65.40	77.0

(George L. Zundel, June 16)

BLIGHT (BACILLUS AMYLOVORUS) ON APPLE

Connecticut: Two reports of fire blight on apples, badly infected, have been received. This may be more abundant than usual. (G. P. Clinton, July 1)

Kentucky: Blossom blight was prevalent and destructive in many parts of the state in spite of a very extended drought during blooming of apples. In some places blight in apples seemed to be correlated with a rain while neighboring pears were in bloom. (W. D. Valleau, June 15)

Arkansas: Blight on apples this year has taken the form of a very severe and widespread epidemic on various apple varieties, particularly the following: Jonathan, Yellow Transparent, Maiden Blush, Grimes Golden, and Golden Delicious. In some orchards the disease has practically wiped out the blossoms and in one block of 600 Jonathan trees located about ten miles north of Ozark, Arkansas, we found 99 per cent of blossom blight by actual counts. This was made about three weeks ago and at that time there was very little twig blight. In other orchards, however, we have found a slight amount of blossom blight and a very heavy epidemic of twig blight. In one 40-acre Jonathan orchard located near Farmington, Arkansas, blight appeared mainly in the latter form although there was also present a slight amount of blossom blight. I believe it is safe to say that fire blight on apples this year has been more destructive than in any year for which we have any records in this state. The specimens and reports that I have received from Missouri indicate that the same condition prevails in the Ozarks of that state. (H. R. Rosen, June 11)

MISCELLANEOUS REPORTS ON FRUIT DISEASES

Pear scab (Venturia pyrina) in Massachusetts: Pear scab was first observed this year June 4 on a few back-yard Kieffer trees. The small fruits were severely affected, showing perhaps 50 per cent infection. Trees had not been sprayed. (O. C. Boyd, June 10)

Powdery mildew and brown rot of peach in Alabama: In the college orchard here at Auburn, powdery mildew (Sphaerotheca pannosa) is very prevalent. In the vicinity of the orchard is a hedge of Dorothy Perkins Rose, apparently from which the fungus has spread to the peaches.

Due to the exceedingly dry spring months, there has not been much brown rot (Sclerotinia fructicola). However, there was a small amount of blossom blight, a few young fruits were infected, and in case rains occur during the ripening, there may yet be considerable damage to the crop.

(J. L. Seal, June 15)

DISEASES OF TREES AND ORNAMENTALS

WILLOW SCAB BLIGHT (FUSICLADIUM SALICIPERDUM) IN CONNECTICUT

So far, seems less abundant than the last three years in spite of favorable weather conditions as shown by the unusual amount of anthracnose on oak and sycamore trees. (G. P. Clinton, July 1)

ENTYLOMA ON NYMPHAEA SPP.

Specimens of Nymphaea marliacea rosea, N. marliacea chromatella, and N. alba affected with Entyloma nymphaeae were collected by D. P. Limber and Robert Cogswell in the District of Columbia, June 12. The disease was observed on two estates. This is apparently the first record of the disease on these species of Nymphaea.

A VIRUS DISEASE OF DELPHINIUM REPORTED FROM KENTUCKY

The following interesting note from W. D. Valleau reports a virus disease of Delphinium which seems to be identical with the "coarse-etch" disease of tobacco:

> "A disease of Delphiniums of the virus type has been under observation for several years. It causes patterns similar to ring spot in tobacco except that necrosis is usually not evident. The virus has recently been transferred to tobacco on six occasions, where it caused 'coarse etch', apparently identical with that commonly found in tobacco. A seed bed is under observation in which fully 25 per cent of the plants are affected with this disease in three separate sowings of one type, while only two affected plants were found in several hundred plants of English hybrids in the same bed. The evidence suggests that the coarse etch virus is carried in Delphinium seed."

SEVERE ATTACK OF IRIS LEAF SPOT

This disease (Didymellina iridis) was observed June 4 in a nursery in Hampden County, Massachusetts on three or four varieties. Most of the affected hills were badly stunted or entirely dead. All plants near those centers of infections showed recent infection of leaves. About five per cent of the 500 plants showed the advanced stage of the disease. (O. C. Boyd, June 10)

SOME SPECIMENS RECEIVED

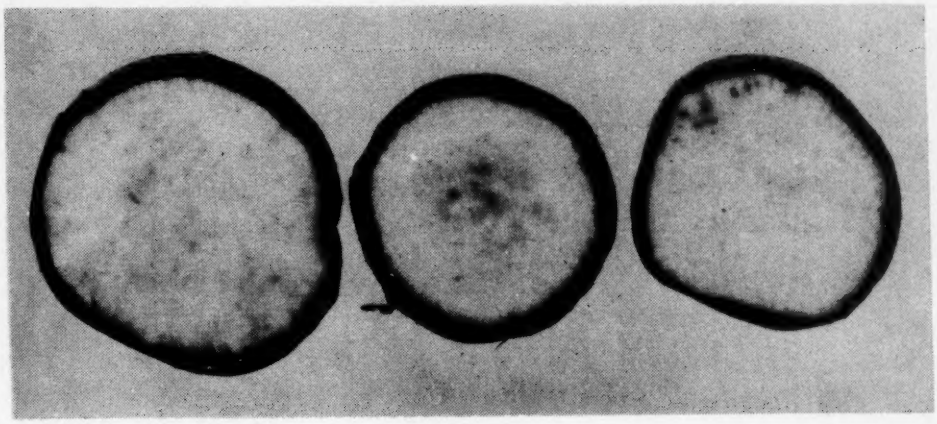
Urocystis tritici on wheat, St. Louis County, Missouri, June 6, I. T. Scott. Leavenworth County, Kansas, May, L. E. Melchers.

Pseudoperonospora humuli on Humulus lupulus from hop field in Polk County, Oregon, June 9, H. P. Barss.

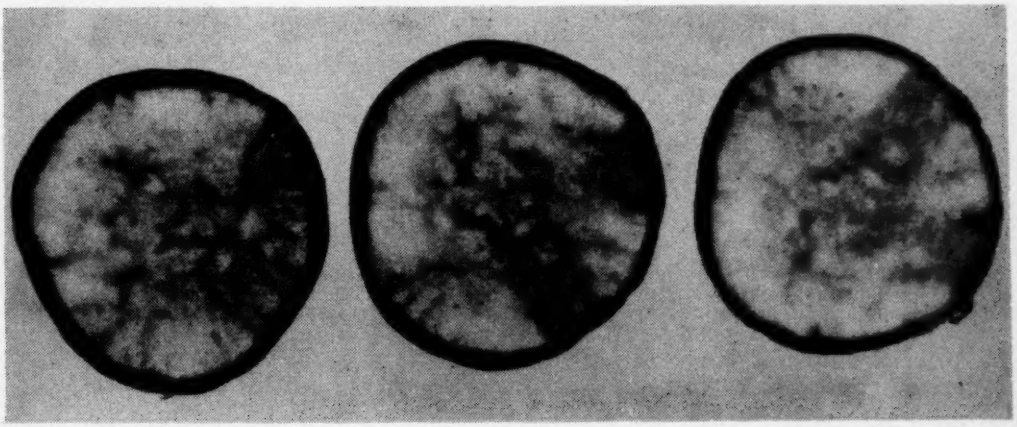
Bacterium tumefaciens on *Acer pseudoplatanus*, East Lansing, Michigan, May 19, F. C. Strohg.

Ravenelia arizonica on Prosopis sp., College Station, Brazos County, Texas, May 13, J. J. Taubenhaus.

Plate 5



A. Early stage of infection



B. Advanced stage of infection

Tylenchus dipsaci on sweet potato tubers. (Photograph furnished by G. Steiner).